

Light and Lighting

Official Journal
of the
Illuminating
Engineering
Society

Incorporating
"The
Illuminating
Engineer."

32, Victoria Street, London, S.W.1.

Telephone: ABBey 5215

Vol. XL.—No. 10

October, 1947

PRICE NINEPENCE
Subscription 10/6 per annum, post free

	Page
Editorial Notes...	169
Notes and News	170
Training of the Illuminating Engineer	173
I.E.S. Meetings ...	174
A.P.L.E. Conference	175
Fluorescent Lighting	183
The Editor Replies	185
Lighting of Farm Buildings	187
Recent Patents ...	190

The Training of the Illuminating Engineer

THE Training of the Illuminating Engineer has become a problem of outstanding importance. That this is realised by the rank and file is shown by the increasing number of entries for the City and Guilds Examination in Illuminating Engineering—nearly 50 this year as compared with a mere half a dozen only a few years ago.

Dr. Walsh, in his Presidential Address to the I.E.S. (see p. 173), has reviewed this problem very fully. He points out especially the danger of undue and too early specialisation—the need for a good background of scientific, technical and general education.

The proposed I.E.S. Register of Lighting Engineers, to be brought into operation in the near future, is a most important departure. Its object and limitations should be clearly understood. It is something quite apart from Fellowship (many on the Register will not aspire to become Fellows, and some Fellows may well not be eligible for registration). It is not a condition of membership. It does not, of course, convey any right to practise. But it should furnish a "hallmark", an indication of competence according to the standards which the I.E.S. adopts.

NOTES & NEWS ON

ILLUMINATION



I.E.S. Summer Meeting

Reference has already been made in these columns to the proposal of the Illuminating Engineering Society to hold a summer meeting at Harrogate next year. This is an entirely new venture for the Society, though it was originally suggested before the war that events of this kind should be held in turn at the various local centres of the Society. Plans for this meeting are now going ahead and we are able to give some advance information regarding the provisional programme for the benefit of I.E.S. members and others who will be interested.

The duration of the meeting will be from June 16 to 19, opening with a reception and social evening on Wednesday 16. During the next two days papers on the following subjects will be read: Decorative Lighting, by Mr. L. H. Hubble; Plastics in the Lighting Industry, by Dr. W. E. Harper and Mr. Walker; The Design of Fluorescent Lighting Installations, with Particular Reference to the Textile Industry, by Mr. E. Smith and Mr. T. C. Holdsworth; and New Lamp Developments, by Mr. N. L. Harris. These papers, which it is felt will have a wide appeal amongst members of the I.E.S., will be of a general and informative character and it is hoped that they will give rise to good discussions following their presentation. It is understood that advance copies of the papers will be available before the meeting and that authors will

be asked to present their papers in summary with as much demonstration and illustration as possible, giving good time for adequate discussion on the printed paper.

The programme will also include the annual general meeting of the Society, following which it is the custom to invite some prominent scientist to address the Society. On this occasion the Society have been very fortunate in securing Mr. Ward Harrison, Director of Engineering to the Lamp Department of the General Electric Company of America, to give the address. Mr. Harrison is well known to members in this country for his contributions to illuminating engineering and especially for his work on glare ratings, and they will look forward to meeting him and hearing from him at first-hand.

After five sessional meetings it was thought that members and ladies would appreciate a lecture on some subject which, though having some relation to lighting, is not normally considered part of the activities of the I.E.S. It has, therefore, been arranged for Mr. L. C. Jesty, of Cinema Television, to give a talk on television which, in view of the great strides now being made in this field, will no doubt be appreciated by all attending the meeting.

Nor is the programme without its quota of social events. For, though such meetings as this provide excellent opportunities for those in the industry to

gather together to hear technical papers and to join in discussions, social activities provide relief from the business of the day and opportunities for informal discussion. Perhaps the most important event of this nature will be the annual dinner, which, for the first time, will be held other than in London. Other events in view include a ladies' outing, a trip to the Yorkshire Dales in which all may take part and which will be arranged so that it does not coincide with the sessional meetings, and it is hoped that a mannequin parade will be arranged for the benefit of the ladies.

Arrangements are also being made for a golf competition for which the North Midland Area are presenting a cup, to be known as the "Dow Cup." Details of the competition are not yet available but it is hoped that the cup will be played for annually or at such similar functions which may be arranged by other Centres from time to time. The cup will therefore be held by the winner until it is next played for, but the North Midland Area will also be presenting the winner with a small replica which he shall retain.

From the above it will be apparent that those responsible for the organisation of this meeting are arranging a very interesting and full programme, and it is to be hoped that as many I.E.S. members as possible will endeavour to be present at this event, which promises to be at least as important to the lighting industry as the 1946 Convention held in London.

Mention should also be made of the fact that this summer meeting precedes the meeting of the International Commission on Illumination, which is to be held in Paris from July 1—7, by only two weeks. It is hoped, therefore, that a number of delegates to this latter meeting will extend their visit to Europe so as to enable them to attend the meeting in Harrogate. It is hoped also that this gathering will be, in part, of an international nature and that I.E.S. members will have a unique chance of exchanging information with lighting engineers from all parts of the world.

I.E.S.' Liverpool Centre

Luncheon Meeting

A most successful luncheon meeting was arranged by the I.E.S. Liverpool Centre at the Adelphi Hotel, Liverpool, on Monday, October 6, when nearly a hundred members were present including Dr. J. W. T. Walsh, the new I.E.S. president, and Mr. G. F. Cole, I.E.S. secretary. The chair was taken by Mr. L. G. Harris.

In proposing the toast of the City and Port of Liverpool, Dr. Walsh recalled the rapid progress of this centre which first came into being as a group in January, 1945. Membership by the middle of the year was over 50 and Centre status was granted at the beginning of the session in October that same year. Dr. Walsh said that the Liverpool Centre were to be congratulated on their activity and was warmly supported when he referred to the good work that had been done by their honorary secretary, Mr. K. R. Mackley. He also said that the City of Liverpool might well be proud of the work of the I.E.S. in their city and quoted Charles Dickens, who is reported to have expressed high admiration for the civic spirit of Liverpool in tackling ignorance and shedding light in dark places.

The response to this toast was made by the Lord Mayor of Liverpool, Alderman W. G. Gregson, J.P., who in a short and witty speech thanked the Liverpool Centre for their kind invitation and Dr. Walsh for his remarks.

Mr. H. S. Magnay, Director of Education for the City of Liverpool, was then called upon to address the meeting. As his subject Mr. Magnay chose higher technological education and presented a very clear picture of the need for technical education in this country and for liaison between industry and the technical colleges, comparing the position in this country with that in America where the number of trained personnel passing

into industry from the technical colleges was many times greater than here.

He stressed the importance of teachers keeping their knowledge up to date by maintaining a close touch with industry. At the same time, he said, industry should be prepared to send their best men to the schools from time to time to pass on their knowledge and to encourage the students. Though he was thinking of technical training generally it applied equally well to illuminating engineering, as he felt sure that if, during the course of a term, two or three prominent men in the field of lighting could be persuaded to visit the technical colleges and speak with the students it would give the latter great encouragement and have a very beneficial and lasting effect on them.

The present aim, therefore, was to raise the status of technical colleges and to attract the best brains amongst the younger men into industry. Under the new educational system we must look to the boys in the secondary technical schools as recruits to industry, but, Mr. Magnay pointed out, they will not be attracted until they see an adequate reward for their studies. It is essential therefore that, as technological courses will be equivalent to a university course, the award at the end of the course must be in the nature of a degree. This would be the greatest single factor in attracting young men into industry and the award must be one that has world-wide recognition. This was a problem that all industries would have to face sooner or later, and though difficulties such as examinations and awarding bodies may be great Mr. Magnay anticipated that they would be overcome in time.

In conclusion he said that he looked forward to the co-operation of the I.E.S. and similar bodies in furthering technical education, for unless industry and education worked together the result would be failure and the prosperity of the country would suffer.

The chairman, Mr. L. G. Harris, then proposed a vote of thanks to Mr. Magnay and to the other guests who were present and paid tribute to the efforts of Mr. Mackley to whom the success of the Liverpool Group was so largely due.

Shop and Store Lighting

Shop and store lighting, whilst somewhat under a cloud at present—at least so far as windows are concerned—is evidently a live subject and attracted an audience of about 70 at the recent meeting of the I.E.S. Cardiff Centre. After tribute had been paid to the late Professor T. David Jones, Mr. J. Trevor Jones took the chair, and called upon Mr. F. Jamieson to read his paper on the above topic. The audience seems to have been a very varied one, architects, advertising agencies, hotel and restaurant proprietors, shopkeepers, being all represented—not to forget representatives of the G.P.O. and the Board of Trade. As a result, a number of inquiries for programmes of future meetings have been received.

Birmingham I.E.S. Centre

The Birmingham Centre of the I.E.S. opened the session with a visit to the works of the British Thomson-Houston Co., Ltd., at Rugby, in which some sixty members took part. After the party had been shown the various departments a paper entitled "New Lamps, New Uses and New Lighting Techniques," was given by Mr. H. R. Ruff, a member of the staff. The paper was of considerable interest and was illustrated by films and demonstrations. Before leaving Rugby the members had an opportunity of inspecting an installation of fluorescent street lighting.

Light and Lighting

Increase In Subscription

Subscribers are reminded of the forthcoming alteration in subscription rates, notice of which was given in our August issue (p. 138).

From January 1, 1948, onwards the price of **single copies will be One Shilling** and the annual subscription **Fifteen Shillings.**

The Training of the Illuminating Engineer

In what follows we give a summary of the Address delivered by the new President of the I.E.S., Dr. J. W. T. Walsh, at the opening meeting of the Illuminating Engineering Society on October 14th

In opening his address Dr. Walsh recalled that ever since the foundation of the Society in 1909 membership had been open to anyone interested in illumination. In other words the Society was wholly cultural in character and made no attempt to join the ranks of the professional institutions. At the same time, however, recent progress in the art and practice of illuminating engineering, to which the Society has largely contributed, has been so great that a new profession—that of the illuminating or lighting engineer—has arisen.

One effect of this is the need that is widely felt for some hall-mark of a competent lighting engineer—a hall-mark which would be of value not only to the holder but also to those wishing to distinguish the expert from the incompetent. The Society was therefore faced with the problem of either changing the basis, on which it had worked so long and so successfully, by ceasing to admit any but the professional lighting engineer, or of retaining its status as a cultural body and not attempting to apply any professional hall-mark to those of its members who were engaged in this new and growing branch of the engineering profession. Fortunately, a compromise has been found by which the required distinction can be applied without affecting the conditions of membership to the Society.

If this hall-mark is to be of the greatest possible value, not only to its holder but to the Society and to the world at large, the basis on which it is granted needs the most careful thought. It is clear that, as in all other professions, the competent lighting engineer must have a good educational background and a sound theoretical know-

ledge of those subjects underlying illuminating engineering. The preamble to the syllabus of the City and Guilds examinations in illuminating engineering points out that students entering upon the course must have reached certain standards in ancillary subjects, and it cannot be too strongly emphasised that early specialisation in illuminating engineering before an adequate background in all the basic subjects has been obtained, can only lead to difficulties at a later stage. The students must therefore have at least enough knowledge of the theory of the subject to be able to pass the intermediate grade of the City and Guilds examination.

It is to be hoped that the Society will pitch its demands high. It is most important that the profession should quickly come to be recognised as one demanding a severe discipline on the part of those entering it. Those making the attempt should be prepared for at least five years part-time study on the theoretical side, after attaining the school certificate, and for a practical training covering the period and at least three further years of more advanced and responsible training under the eye of a qualified lighting engineer. Following the intermediate grade a theoretical training up to the standard of the Advanced Grade Section A and a practical training to cover Section B might well be demanded.

Lack of experience in the design of lighting installations may be a serious handicap to some of those wishing to obtain this hall-mark, and there will be cases where it is necessary for the trainee to get part of his experience with one organisation and the rest with another. Dr. Walsh appealed to sustaining members of the Society for breadth of vision and a willingness to accept the need for a change from one firm to another on the part of the trainee and, in fact, active encouragement to him to make such a change at a suitable stage in his training.

In conclusion Dr. Walsh put forward some suggestions for overcoming the problem faced by many students of the lack of suitable instruction classes within a reasonable distance and some sound advice to the would-be lighting engineer.

Forthcoming I.E.S. Meetings (Provisional List)

MEETINGS AND VISITS IN LONDON

1947.

Nov. 11th. Sessional Meeting. MR. F. WIDNALL on The Design of Industrial Lighting Equipment. (At the Lighting Service Bureau, 2, Savoy Hill, London, W.C.2.) 6 p.m.

Nov. 25th. Informal Meeting. PROF. H. HARTRIDGE on Recent Advances in the Physiology of Vision. (At the Lighting Service Bureau, 2, Savoy Hill, London, W.C.2.) 6 p.m.

Dec. 9th. Sessional Meeting. DR. J. H. NELSON on Colour and Lighting in Industry. (At the Lighting Service Bureau, 2, Savoy Hill, London, W.C.2.) 6 p.m.

MEETINGS OF CENTRES AND GROUPS

1947.

Nov. 3rd. MR. H. E. CARRINGTON on Colour. (At the Leeds Corporation Electricity Dept., Whitehall Road, Leeds.) 6 p.m.

Nov. 3rd. MR. S. ANDERSON on Cold Cathode Tubes. (At the Medical Library, The University, Western Bank, Sheffield.) 6 p.m.

Nov. 6th. MR. L. C. RETTIG on Lighting and Safety in Factories. (Joint Meeting with the Royal Society for Prevention of Accidents.) (At the Mackworth Hotel, Swansea.) 3.15 p.m.

Nov. 6th. DR. J. N. ALDINGTON on The Evolution of an Electric Lamp. (Joint Meeting with the Institution of Electronics, North-Western Branch.) (At the Reynolds Hall, College of Technology, Sackville Street, Manchester.) 6.30 p.m.

Nov. 6th. Film Night. (At Exeter.)

Nov. 7th. Film Night—Lamp Manufacture and Street Lighting. (At Radiant House, Bristol.) 7 p.m.

Nov. 7th. MR. H. G. JENKINS and MR. J. N. BOWTELL on High Voltage Fluorescent Light Sources. (Joint Meeting with the Institution of Electrical Engineers and the Electrical Contractors Association.) (To be held at Messrs. Joseph Lucas, Limited, Farm Street, Birmingham.) 6 p.m.

(Secretaries of Centres and Groups are requested to send in particulars of any changes in programme, mentioning subject, author, place, date and time of meeting; summaries of proceedings at meetings (which should not exceed about 250–500 words) and any other local news are also welcome.)

1947.

Nov. 7th. DR. J. WARD on The Application of Polarised Light. (At the City of Nottingham Gas Dept., Demonstration Theatre, Parliament Street, Nottingham.) 5.30 p.m.

Nov. 7th. MR. D. C. JAMES on Store and Display Lighting. (At the Electricity Showrooms, Market Street, Huddersfield.) 7 p.m.

Nov. 13th. MR. A. CUNNINGTON on Railway Lighting. (At the Corporation of Leicester Electricity Dept., Demonstration Theatre, Charles Street, Leicester.) 6.30 p.m.

Nov. 18th. MR. J. K. FRISBY on Light for Selling. (At the Liverpool Corporation Electricity Showrooms, Whitechapel, Liverpool.) 6 p.m.

Nov. 18th. DR. J. H. NELSON on Automobile Lighting. (At Stoke-on-Trent.)

Nov. 19th. Address by the Chairman (MR. H. DICKINSON). (At the Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough.) 6.15 p.m.

Nov. 20th. MR. P. CORRY on Light and Colour in Paly Production. (At the Bradford Corporation Electricity Offices, Sunbridge Road, Bradford.) 7.30 p.m.

Nov. 21st. MR. W. A. R. STOYLE on The Operation, Maintenance and Servicing of Fluorescent Lamps. (Joint Meeting with the Edinburgh Electrical Society.) (At the Heriot-Watt College, Chambers Street, Edinburgh.) 6.30 p.m.

Nov. 27th. MR. R. O. ACKERLEY and MR. ALISTER MACDONALD on The Place of Science in the Art of Lighting. (At the Institution of Engineers and Shipbuilders in Scotland, 39, Elmbank Crescent, Glasgow, C.3.) 6 p.m.

Dec. 1st. MR. H. R. RUFF and MR. I. G. FOWLER on Black Light. (At the Leeds Corporation Electricity Dept., Whitehall Road, Leeds.) 6 p.m.

Dec. 1st. MR. T. O. FREETH on Lighting in the Home. (Joint Meeting with the Sheffield Electrical Association for Women.) (At the Medical Library, The University, Western Bank, Sheffield.) 6 p.m.

Dec. 2nd. MR. H. R. RUFF and MR. I. L. FOWLER on Black Light. (At the Electricity Showrooms, Market Street, Huddersfield.) 7 p.m.

Dec. 3rd. MR. A. G. PENNY on Some Impressions of Lighting in the U.S.A. (At the Minor Durant Hall, Oxford Street, Newcastle-upon-Tyne.) 6.15 p.m.

A.P.L.E. Annual Conference

In what follows we give an account of the Annual Conference of the Association of Public Lighting Engineers, held in Southport during September 15th to 19th. We hope, in a subsequent issue, to deal with certain of the papers in fuller detail.

The annual Conference of the Association of Public Lighting Engineers was held in Southport from September 15 to 19. There was an attendance of some 800 members and delegates.

Annual General Meeting

The proceedings opened in the Cambridge Hall, Southport, on Monday afternoon, September 15, with the annual general meeting, at which the retiring President—Mr. W. N. C. Clinch—presided.

The usual loyal message was sent to His Majesty the King. Greetings were also sent to the I.E.S. National Technical Conference of America, now meeting in New Orleans.

Mr. H. C. Brown (Hon. Treasurer) presented the statement of accounts for the year ended December 31, 1946, which showed a balance in hand of £1,329. The accounts were adopted, and a vote of thanks was given to the Hon. Treasurer.

The following elections as President, Vice-President, and Members of Council were announced:

President: Mr. Thomas Wilkie (Leicester). Unopposed.

Vice-President: Mr. N. Boydell (Eastbourne). Unopposed.

Members of Council, as a result of ballot, to fill vacancies: Mr. L. A. Doxey (Leeds), Mr. J. H. Morrison (Bolton), Mr. P. Richbell (Croydon).

Associates' Representatives (re-elected): Mr. P. Crawford Sugg, Mr. E. Stroud.

The President announced that Mr. C. I. Winstone (Gas Light and Coke Co.) and Mr. E. J. Stewart (Glasgow) had both expressed a desire to retire from the Council. As a mark of appreciation of the work which he had done for the Association for many years a

message of good wishes was sent to Mr. Winstone, who had been elected an Honorary Member.

The President recalled that Mr. Stewart had held the office of President throughout the war from 1939 to 1945 and served the Association with distinction during that difficult period. In expressing the sincere thanks of the Association to Mr. Stewart he said it was a great satisfaction to know that he had consented to continue as Honorary Editor of the Transactions.

Continuing, the President also referred to the Papers Competition, which was started two years ago. He stated that it was not until late in July that five papers were received, consequently there had not yet been time to adjudicate upon them but this would be done and the result announced in due course.

This closed the proceedings of the annual general meeting.

Official Opening of Conference

His Worship the Mayor of Southport (Councillor James Peet, J.P.) then officially opened the conference. He extended a cordial welcome to the Association, remarking that the conference would show the great advance that had been made in street lighting since the days when the lamplighter went round and lighted the flat flame gas burners, a form of lighting which was thought wonderful at the time.

The President, thanking the Mayor for his welcome, recalled that the conference consisted not only of professional street lighting engineers but representatives of the people whose assistance the professional lighting engineers desired so that the best application of lighting could be obtained to ensure safety on the roads. He added that it was difficult in present circumstances to do all that was desired in public lighting but every effort should be made to pave the

way for the morrow when we all look forward to better times.

Inducting the new President, Mr. Clinch referred briefly to the work of the Council during the past session, mentioning the deputation which had visited the Ministry of Transport, which had consulted the Council on matters relating to street lighting, such as the present position of street lighting and the results of restriction. He recalled that Mr. Wilkie had been President in 1930. He asked members to give him the same support and confidence that he himself had received during his term of office.

Mr. Wilkie, taking the Chair, said that as his presidential address was to be given on the following day, he would say nothing now that would forestall anything he would say then. It gave him great pleasure, however, as his first duty, to propose that a cordial vote of thanks be given to Mr. Clinch for the manner in which he had carried out the duties of President during the past year.

The vote of thanks was cordially given and Mr. Wilkie presented Mr. Clinch with the past-President's Badge and Certificate.

The President said he had received a message from Mr. Langlands, the first President of the Association, expressing his regret that he was not able to attend the conference this year.

Continuing, he expressed the thanks of the Association to Mr. W. T. Gann, the Southport Borough Electrical Engineer, and Mr. H. J. Risby, the Southport Borough Gas Engineers, for their great assistance in connection with the arrangements for the conference, and particularly in regard to the demonstration street lighting installations that had been erected for the conference.

Mr. N. Boydell (Eastbourne), the newly elected vice-president, then expressed his appreciation of the honour done him, and his chairman—Councillor Marshall—extended a cordial invitation to the Association to hold its next Conference in Eastbourne. The Conference then adjourned until the following morning, Tuesday September 16.

The Presidential Address

In his address, the incoming President, Mr. Thomas Wilkie, recalled the formation of the Association in 1934, and referred to the growth of membership and progress since that date. He also recalled three outstanding points in his address when previously President, in 1930. These were (1) the need for legislation, laying on local authorities definite responsibility for providing public

lighting; (2) the desirability of street lighting being the concern of a qualified official, especially in large areas; and (3) the importance of street lighting in relation to road safety. All these points are of outstanding importance to-day. Mr. Wilkie dwelt at some length on this last question, making various suggestions—for example, that in every local authority there should be a committee with full authority to deal with road safety.

In this connection the President was led to comment on recent and existing restrictions in street lighting, remarking that the small amount of coal required for public lighting, and the very small possible saving through economy, was not properly appreciated. Apparently coal saving was considered more important than saving life.

Street Lighting in Relation to Road Safety

The President's address was followed by a paper on "Street Lighting in Relation to Road Safety," by Mr. A. E. Merchant (Barking) and Mr. Robert Bell (Erith).

The paper, which covered also traffic problems and crime prevention, went over a great deal of familiar ground in regard to the effect of adequate street lighting on road safety generally, and gave some figures of accidents by night and by day. There was a general complaint that really useful statistics of accidents in this country are not available, and the authors had to rely to a considerable extent on American figures. The authors themselves appreciated that they were speaking to the converted in this matter, but the hope was that the importance of it would be brought home to the highest quarters.

There were present at the meeting some 20 chief constables from Lancashire, Cheshire, and Yorkshire, and one representative from Scotland Yard. Some of them took part in the discussion, and they generally agreed that adequate street lighting is not to be regarded as an amenity but as a necessity. On the present position, which has decided the Government to call for a reduction of 50 per cent. in street lighting—and it should be recorded that this decision was taken at Cabinet level and not by any Ministry—these police representatives had nothing to say. The general trend of their remarks was that when conditions permit, every effort should be made to increase street lighting beyond the limits that were known pre-war.

Mr. W. Bicknell (Siemens) pointed out

that a sub-committee has been appointed by the Road Research Board, under the chairmanship of Sir Clifford Paterson, "To consider the general question of street lighting in relation to road accidents and to make recommendations as to the best method of securing adequate lighting for the needs of vehicular and pedestrian traffic."

The absence of reliable statistics in this country was stressed again and again, and further American figures were mentioned. Mr. F. W. Axford (Northmet Co.) said that in Detroit the night fatality rate had been considerably reduced by improved street lighting, and referring also to Hartford, he pointed out that in addition to a considerable reduction in night accidents, the cost to the community had been greatly reduced. A new lighting scheme cost 25,000 dollars per annum, as against 17,000 dollars previously, but the cost of accidents fell from 53,000 dollars to 18,500 dollars.

Co-operation between the lighting authorities and the police in relation to new schemes of lighting or improvements of existing ones was urged, and indeed welcomed, by the police representatives. It is already being practised to a considerable extent.

Mr. L. T. Minchin commented on the dazzling effect of beacon lighting and urged the need for some cut-off arrangement to prevent this.

There were complaints about the decision to cut street lighting by 50 per cent., but, on the other hand, the political aspect crept in, and there were certain local authority representatives who held the view that the Government can do no wrong, and they would not hear of any criticism of this decision. Indeed, on the contrary, they spoke of the psychological effect of full street lighting when industry could not get sufficient fuel to raise steam. However, another aspect of the psychological point of view was that with partly blackened out streets there would be feelings of depression and frustration, accidents, and need for hospital treatment, less social intercourse and going to entertainments, and therefore more fuel used in the homes, so that on balance, it was argued, the final result would be very little, if any, saving at all.

Mr. J. Howard Long pointed out that this matter had been discussed by the Association for many years and yet little progress was being made. If that attitude of the authorities were to continue, he suggested it was little point in the Association carrying on its campaign. Generally speaking, it was perhaps recognised that little can be done about the 50 per cent. cut, although the President

on more than one occasion expressed the hope that it would be cancelled. Therefore, the attitude was to go ahead and make such modifications of existing installations as are possible and prepare for the time when the street lighting engineer will be given a free hand.

The Maintenance of Public Street Lighting

On Tuesday afternoon, September 16, a paper entitled "Maintenance of Public Street Lighting" was read by Mr. J. Woodhouse, of Sheffield, one of the few towns where there is a separate Lighting Department.

The paper gave a considerable amount of detail of the methods adopted in the maintenance of the electric and gas street lighting in Sheffield. The view is taken there that an installation is only "new" for two weeks, after which it must be watched and cared for to ensure that its efficiency never falls below a certain level.

The discussion revealed the obvious fact that a system that is suitable for one town or city is not necessarily suitable for others, and even although there were a few speakers who said their conditions were similar to those in Sheffield, their methods were not necessarily the same. In others, quite different methods had to be adopted.

Mr. A. G. Tookey, of Bristol, characterised the treatment of the refractors in Sheffield—they were taken home, and washed in soap and water—as a "beauty" treatment, and hinted that it would be cheaper and as efficient if they were cleaned *in situ*. He also criticised the filling in of forms by the lamp attendants—in which he was supported by other speakers—and thought it should be done by the foreman or inspector. In any case, the filling in of forms could be overdone.

Mr. R. S. Bradley (Portsmouth) expressed disappointment that the paper did not go into details of costs of all items of street lighting equipment and said the paper suggested that gas lighting was more costly to maintain than other forms of lighting. Were electric controllers used in Sheffield and, if so, how were they maintained and at what cost? He paid a tribute to the manufacturers of street lighting equipment and as an alternative method of cleaning refractor prisms he suggested the use of a wood sawdust made damp with a degreasing agent, this being subsequently blown out by a portable hot air blower.

Mr. R. L. Greaves (St. Helens) spoke

of the use of armourplate glass in St. Helens to reduce wilful damage to fittings and in connection with refractors, suggested the use of smooth glass, which could be easily cleaned.

Mr. J. Howard Long again took the practical point of view and asked what was the use of giving increasing attention to the science of planning in order to get the most effective and efficient use of light sources if all these efforts were to be nullified by rapid deterioration due to inefficient maintenance. In his view, wherever practicable, lighting equipment should be completely dust-proof and the glass or other transparent surface should be so disposed that it did not collect dust falling by gravity.

Mr. R. Parker (Aberdeen) also criticised lack of detail in the paper and said it dealt only with the single-piece type of refractor. Manufacturers were fully aware of the defects of this and there was available the two-piece refractor with sealed prisms and the so-called non-ventilated type. Had the author any experience of these and, if so, what was the relative labour cost of cleaning. Was any investigation carried out as to the method of testing dirt accumulation by reference to the loss in visibility, before the integration method was adopted at Sheffield. Also, could the author give relative costs of maintaining different types of fitting.

Mr. W. Hime (Yorkshire Electric Power Co.) spoke of the different conditions in his scattered area and the impossibility of applying the Sheffield methods there.

Mr. L. A. Doxey (Leeds) said his conditions were similar, but he adopted different methods, cleaning in some parts of the city every week and in others every 16 or 17 days, but never three weeks, as at Sheffield. He asked manufacturers, before they put a new fitting on the market, to experiment by erecting and maintaining a number of them from the top of a tower wagon in bad weather. Then they would know something of the lighting engineer's and lamp attendant's problems. He also pleaded for dust-proof fittings.

Mr. C. C. Smith (Liverpool) said refractors were not employed in Liverpool, and he doubted whether they were as efficient as they were made out to be. Too much attention had to be given to them to get the best results. He preferred cut-off lanterns so that the light could be put where it was wanted on Class A and B roads.

Mr. J. H. Morrison (Bolton) spoke of developments with refractors which seemed worth while, but, at the same

time, expressed a preference for taking them down and forgetting all about them!

Mr. P. Richbell (Croydon Gas Company) described his method for dealing with nightly and week-end inspections and of the difference between the labour problem in the North and Midlands and in the London area. Foremen did this work and were provided with vans for the purpose, as well as weatherproof clothing for bad weather.

Mr. H. J. Risby (Gas Engineer, Southport) described his two-shift system for inspection and cleaning, and mentioned that he kept his staff keen, where the men were inclined to be slack, by warning them that gas lighting would be displaced by electric lighting, and that they would lose their jobs!

Mr. Woodhouse replied to some of the points mentioned in the discussion, and said he had not given costs because they varied according to the circumstances in different places and they were difficult to compare. He said he had not yet found a dustproof fitting, and that the two-piece refractor which had been used before the war seemed to permit dirt to get in. Investigations, however, are being carried out in this connection. He claimed that the single piece refractor, if properly cleaned, was as good as new. This suggested that at Liverpool the standard of maintenance should be improved.

As to collaboration with the manufacturers, he said that at a previous conference a joint committee with the manufacturers was suggested. Perhaps this conference would like to go farther into that.

The conference then adjourned.

Street Lighting Photometry

On Wednesday morning, September 17, a paper on "Street Lighting Photometry" was read by Dr. S. English (Technical Director, Holophane, Ltd.).

The earlier part of this paper contained a brief historical survey of the development of street lighting, following which the development of street lighting specifications was reviewed and particulars were given of M.O.T. reports on this subject. In this connection Dr. English discussed the measurement of street lighting installations in relation to the Ministry of Transport reports and the draft specification (upon which he is known to have some very definite views), and made some proposals for the appraisal of street-lighting fittings by the aid of measurements of candle-power at certain specific angles.

He said that now that the preparation of a revised standard specification based on the M.O.T. reports had been temporarily abandoned, the proposed Code of Practice would, of necessity, put forward general recommendations. The street lighting engineer might well wonder what measurements he should take to serve as a check on the maintenance of the installation to a certain degree of its original performance. Here, he said, we come up against a problem, the solution of which is a long way off, and the best methods of approaching that solution were very much matters of personal opinion.

The concluding part of the paper was devoted to an interesting review of illumination photometers in the course of which allusion was made to the original Trotter photometer, of which a derived version was exhibited, and to progressive stages in the design of the "lumeter" instrument—which had been redesigned as a result of the destruction of available patterns during an "incident" in the war.

Dr. N. A. Halbertsma (Holland), who opened the discussion, did not agree with the measurement of candle-power in certain directions in the street because it was very difficult to prevent extraneous light affecting the measurements so taken. There were sources of error on the road which were far worse than any encountered in the laboratory, and there was greater difficulty in ensuring constant voltage. There was a great deal of work yet to be done in connection with the measurement of brightness as distinct from illumination. One feature of all brightness measurements was that there were so many factors involved. He recalls that at one of the meetings of the International Commission on Illumination a simple method of measuring brightness had been suggested, and, personally, he thought certain simplifications were possible in this connection.

Mr. E. Stroud thought the suggestions in the paper made the draft specification more complicated and difficult to operate. It could be assumed that the work already put into the draft would not all be lost and that the recommendations, all or in part, would be included in the Code of Practice. The author's suggestions involved, essentially, testing the distribution curve of the lantern at the main peak angle through the vertical non-axial by 10 or 12 deg. Such measurements ignored the horizontal width of the beam and also the distribution closer to the lantern and, in his opinion, would be subject to the same

criticism as the "test point" values of the original B.S. specification No. 307. Surely such measurements would better and more accurately be made in the laboratory. For a road measurement of achievement, the type of measurement mentioned in the draft specification, which took into account the lanterns beyond the one nearest the test point, was surely the most practical. A fetish had been made of road brightness. It should be given its rightful place as one factor in the general scheme and not the major consideration.

Mr. F. Hartill suggested that in any future specification or Code of Practice, it would be desirable to include some limitation in lantern brightness in certain directions. If this was not practicable, there should be some recognition of the merits of sources of low brightness. As far as he was aware, there was no clause in the M.O.T. final report or in any B.S. specification which dealt with the brightness of a street lighting lantern.

Mr. H. S. Allpress said the second part of the paper was quite separate from the first, but he could not follow the basis of all the later arguments.

Mr. L. T. Minchin said it was important for the lighting engineer to find out what his lumens were doing, and although some people thought it was more satisfactory to test in the laboratory, he felt that there was a real need for the man on the job to be able to see whether he had been given what he expected. In too many cases there was a tendency to disregard the brightness of the footways and over-emphasise the brightness of the road surface.

Mr. W. H. Burman did not think that mounting heights, glare factors, etc., should be tied by hard and fast rules. The regulations should be more elastic to take account of the effect of gradients.

Dr. English replied briefly to the discussion.

In the afternoon of Wednesday, September 17, the manufacturers who had installed demonstration lighting installations during the Conference explained the details of them.

Side Street Lighting

On Thursday morning, September 18, a paper was read by Mr. R. W. Steel on "Side Street Lighting."

This was a general review of the problems confronting the illuminating engineer in designing lighting for what were known as side streets; it gave examples showing how the problems were not fully recognised in the past, and indicated how modern practice fol-

lowed the principles underlying the recommendations of the Departmental Committee on Street Lighting as laid down in their final report of 1937.

In the discussion Mr. E. C. Lennox regretted that the author had introduced the idea of a third group of roads because, in his view, the A and B class roads recommended by the Ministry of Transport Report sufficiently covered all needs. There was plenty of room for sub-groups within these two classes. He suggested savings in side street lighting and putting the money towards the improvement of main routes, adding that if saving in coal was to be the criterion in street lighting then there was very much to be said for the use of electricity everywhere.

Mr. C. C. Smith favoured cut-off or partially cut-off fittings, and said that cost—the criticism of this form of lighting in the past—must not be allowed to be the deciding factor. The lighting of side streets should depend on the type of street and greater use should be made of brackets attached to houses in preference to poles in narrow streets.

Mr. H. S. Allpress subscribed to this latter view, and also said he did not think it necessary to provide absolutely even road brightness. The question of the colour of the road surface, the trees, and the number of pedestrians using the road should be taken into account.

Mr. R. Parker also disagreed with the author's suggestion of classes of roads other than A and B. He urged consultation between the street lighting authority and those responsible for laying out building estates in regard to the position of trees.

Dr. N. A. Halbertsma referred to a paper that was to be read at the Convention of the Illuminating Engineering Society in America shortly, and suggested youth education as a means of preventing damage to street lighting fittings.

Mr. J. C. Christopher commented that it was too often the case that side street lighting was planned largely on the principles applying to trunk road lighting, which he deprecated. Side street lighting should be planned primarily for the pedestrian and for police purposes, and he wondered whether in future there would be more lighting of the fronts of houses, the gardens and the pavements and less concentration on uniform road brightness.

Mr. L. T. Minchin said that cut-off lighting for side streets could be very good if properly applied.

Mr. J. A. Prowse criticised the tables in the paper relating to electric and gas

lanterns and contended that the coal consumption for equivalent lighting was much less with electricity than with gas. He asked the author to extend these tables.

Councillor E. Roscoe said he would rather have reduced street lighting if it meant more supplies of fuel for industry.

Mr. H. T. Duke suggested that side street lighting should be planned with the idea that they would in the future become main traffic routes.

Mr. F. C. Smith said that if it were assumed that gas for street lighting was less efficient from the coal consumption point of view than electricity there were still many material factors which placed gas generally in a very favourable position in this regard. He pointed out that the efficiency of the average generating station was only 18 per cent. Moreover, Mr. Prowse had referred only to one use of gas made from coal. As to the reduction in street lighting, he said this had to be faced, and although the lighting engineer would apply his skill to obtain the best results in the circumstances, he maintained there had been lack of imagination and lack of skill in the past in effecting reductions of fuel consumption for street lighting purposes.

Mr. Steel briefly replied to the discussion and said that generally speaking during the next few years we should have to make do with such installations as we now had, but added there is room for improvement in many cases at relatively little cost.

The Design of Lamp Standards

The final session of the conference on Thursday afternoon, September 18, was opened with an address by Mr. A. B. Knapp-Fisher, Secretary to the Royal Fine Art Commission, and he discussed the work of the Commission in relation to improving the design of lamp standards. He pointed out that the Commission had no compulsory powers nor the inclination to force their ideas and ideals upon lighting authorities. At the same time they tried to ensure that their recommendations were practical and realistic. The Commission had wide powers and was charged with safeguarding and improving what were called the "public amenities." However, its work was carried out largely by co-operation and it needed the support of an educated public and of all interested in public lighting. He pointed out that co-operation between the Commission and the electricity supply industry had greatly improved the design

of power stations, and he also mentioned other instances in other fields.

Discussing "street furniture," as he called it, he said the essential quality in the sound design of lamp standards was "fitness for purpose," and added that it is the wish of the Commission to approve all designs in the general interest of the country. He paid a tribute to the manner in which manufacturers of fittings were co-operating with the Commission, pleaded for the full co-operation of all public lighting engineers and authorities, and showed a number of illustrations of lamp standards, the faults and otherwise of which he pointed out.

M. Baart de la Faille (Electrical Engineer, City of Amsterdam) followed with a number of slides illustrating the position in his city, and did not hesitate to criticise many features, not the least being his aesthetic dislike of clustering closely together various standards and posts for different purposes.

Mr. A. E. N. Taylor (Ministry of Transport) referred to collaboration between the Ministry and manufacturers in order to improve the design of lamp standards, adding that these efforts would be abortive without the close co-operation of lighting authorities.

There were a few other critical comments in regard to the design of lamp standards, and this part of the proceedings came to an end after the President had been cordially thanked for the manner in which he had presided during the conference.

There followed an "Open Forum" at which any matter could be raised. There was a demand for separate public lighting committees of local authorities instead of the public lighting being in charge of a sub-committee of another committee. There was also a suggestion that the Council should protest against the 50 per cent. cut in public lighting; a representative of the manufacturers offered the fullest co-operation in all matters relating to public lighting, and there were a number of suggestions of a more or less domestic nature affecting the Association, one of which was that its basis should be broadened and local sections should be formed.

Finally, a resolution was moved and seconded protesting against the cut of 50 per cent. in street lighting, but objection was taken to this being put to a conference from which a considerable number of members had departed. An amendment, which was a direct negative, "That the question be not put," was declared by the President to be carried on a show of hands, and there-

fore the original resolution was not voted upon.

The conference then closed.

The Annual Luncheon

At the annual luncheon, held in the Floral Hall on September 17, the toast of the Association was proposed by Dr. N. A. Halbertsma, who recalled the invention in 1667 of a street lighting lantern (using oil) which was by a Dutch artist, Jan van der Heyden, adopted in Amsterdam and other cities in Europe. He also recalled the experiments with mirrored lanterns of Lavoisier, and, much later in this country, the work of A. P. Trotter who designed the first refractor lantern in 1883. He congratulated the Association on its progress and especially on its services in promoting closer relationship between those concerned respectively with gas and electric street lighting.

The President, in his response, again returned to the effect of economy restrictions in street lighting, arguing that the theoretical saving through a restriction to 50 per cent. of pre-war lighting was only 500,000 tons—about the amount lost in the recent Grimethorpe colliery strike—and even this was doubtful, whilst the diminution might result in increased accidents and other undesirable consequences.

Later Mr. A. E. N. Taylor (Ministry of Transport), when replying to the toast of "The Guests," explained that the decision to cut street lighting by 50 per cent. had been taken at the highest possible level and was not a decision of any Ministry.

Demonstration Street Lighting Installations

Although this year there was no exhibition of street lighting equipment a comprehensive display of the latest methods of lighting both main and side roads was arranged by means of specially erected demonstration installations in the centre of Southport, to which firms in the gas and electrical industries contributed.

Gas exhibits for the lighting of main roads included the "Alpha" lamp by Foster and Pullen Ltd., which incorporates twelve mantles in strip formation, and is fitted with either mirror glass or Staybrite steel reflectors. Elm Works, Ltd., showed their "Majestic" lamp and William Sugg and Co., Ltd., demonstrated their "Southport" lamp which is designed in single or double form for direct mounting to bracket arms. This latter lamp may use either the

"Supervia" strip mantle or a variety of mantle arrangements to suit requirements whilst redirection of light is achieved by means of specially designed "Holophane" refractor plates.

Lamps for class "B" road lighting were exhibited by William Sugg and Co., Ltd., Parkinson and Gowan, Willey and Co., Ltd., Foster and Pullen, Ltd., and William Edgar and Sons, Ltd. Lighting Trades and Welsbach, Ltd., demonstrated a new method of light distribution from gas lamps by means of prisms of heat resisting glass which have the effect of increasing road brightness. Gas illuminated traffic bollards by Franco Traffic Signs, Ltd., and Gowshall, Ltd., were also to be seen.

The electric installations, all of which were for class "A" roads, included mercury and sodium lamps and, for the first time at an A.P.L.E. conference,



G.E.C. fluorescent street lighting at Southport.

installations using tubular fluorescent lamps were demonstrated.

The Brighton Lighting and Electrical Engineering Co., Ltd., exhibited their new "W" lantern which employs a totally enclosed reflector system in conjunction with 140 watt Philara sodium lamps. This lantern controls the upwardly emitted light, as well as that given directly below, to augment the normal sideway emission of light from the horizontally burning sodium lamp so that 80-90 per cent. of the total light is given in the wide lateral angles required for street lighting. Another BLEECO exhibit was their "streamline" lantern which is designed to harmonise with the modern reinforced concrete columns having clean lines with little ornamentation. A further installation using 140-watt sodium lamps was that using the Wardle Engineering Co., Ltd., "Solar" cut-off type traction arm fitting.

Metropolitan-Vickers showed an in-



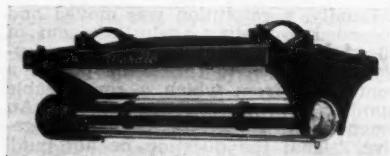
BLEECO streamlined panel lantern.

stallation of 400-watt horizontal mercury lamps in "Trafford" lanterns. The mechanical construction of this lantern is very robust consisting of a one-piece casting forming a canopy and a bracket entry boss. When the lantern is opened the bowl remains securely fixed to the supporting ring, but by means of a detachable hook hinge the whole may be easily lifted from the canopy for cleaning or replacement.

Street lighting by four-lamp fluorescent lanterns was demonstrated by the General Electric Co., Ltd., who installed seven of these lanterns each housing four 4 ft. 40-watt tubes. The average spacing between lanterns was 105 ft., the mounting height being 25 ft. on concrete columns made by Concrete Utilities, Ltd. With all lamps alight the intensity on the road was approximately 5,000 lumens per 100 ft. Provision is also made for two lamps in each lantern to be cut out as required, when the intensity on the road is then reduced by half.

The B.T.H. Co., also showed fluorescent street lighting with "Mazdalux" lanterns which use three 80-watt fluorescent tubes, whilst the Revo Electric Co., Ltd., demonstrated their "Sol-etern" lanterns which incorporate two 80-watt tubes.

Other electric installations were by Siemens Electric Lamps and Supplies, Ltd., who showed their "Euston-Sieray" lantern which is designed for either 250 or 400-watt horizontally burning mercury lamps; Falk Stadelmann and Co., Ltd., and Holophane, Ltd., who demonstrated their new side entry "Holophane" lantern for 400-watt horizontal mercury lamps.



Wardle traction arm fitting.

Fluorescent Lighting in Mines

Following the article on improved lighting in mines which appeared in our September issue we are pleased to give some information on tests which are now being carried out by the National Coal Board with the assistance of the General Electric Company on the use of fluorescent lighting in mines.

Both in the roadway and at the coal face the need for more lighting is appreciated but the problems involved are immense. For instance, at the face the fittings are frequently, sometimes every day, removed and re-erected in a different place; they must be flameproof and strong enough to withstand shot firing at a few feet, yet capable of emitting a useful amount of light in an atmosphere permanently laden with dust and dirt. In addition, glare must be avoided when the ceiling is often only three feet above the floor and the walls, floor and ceiling are pitch black.

Compared with the filament lamp the fluorescent tube has the advantage of high efficiency, low brightness and greater intrinsic safety. On the other hand the filament lamp is more simple, smaller both in size and weight, and it is cheaper. It is to determine the merits of the new source therefore that the N.C.B. is now carrying out a series of tests at coal faces.

The first installation will be at the Chislet Colliery for which the General Electric Company are making special fittings comprising 15-watt 18-in. fluorescent lamps fitted with Perspex covers, the control gear being housed in the canopy. Tests have already shown that Perspex is satisfactory as regards strength, freedom from dust collected by electrostatic charge, and ability to transmit light even when badly scratched. Two fittings will be connected permanently to a 15-ft. length of cable, and each fitting to one half of a new G.E.C. lightweight coupler by a short length of cable so that the whole system can be rapidly moved forward as the coal face advances.

It is understood that some of the test installations will be in operation this year and the results will be eagerly awaited so that the lessons learned can be applied without delay. These tests are some of the most important ever undertaken by the lighting industry.

Coal Mines (Lighting) General Regulations

Prominence has recently been given in these columns to the importance of lighting in coal mines and mention has been made of the Mines (Lighting) General Regulations, 1947. A memorandum issued by the Ministry of Fuel and Power (H.M. Stationery Office, price 3d.) points out that the object of these regulations is to improve the standards of underground lighting to the maximum practicable extent consistent with safety considerations. The Regulations cover both general lighting and individual lamps and deal specifically with whitening of the roof and sides, provision of general lighting and considerations applicable to mains lighting.

The Regulations now require that certain places in a mine shall be whitened and provided with sufficient and suitable general lighting by means of fixed electric lights operated from the mains or by compressed air, or by means of electric safety lamps or other suitable means. The illumination required is not given but should, it is stated, be such as to enable men to work or pass with safety and efficiency without the aid of portable lamps.

On intake roads mains lighting is now permitted except within fifty yards of the face as compared with three hundred yards under the 1934 Regulations. On other roads the distance from the face is unchanged. To this extent mains lighting may be used in all mines without restriction, but in many mines it may be used subject to certain conditions, up to within ten yards of the face. The new Regulations also permit a voltage up to 250 to be used for mains lighting, as against the previous restriction of 125 volts, and call for protection of the lamp, fitting and cable against accidental damage, e.g. by shot firing.

Attention is also given to the provision of good illumination by means of safety lamps for which new standards of performance have now been prescribed. From the beginning of 1949 the new standard will apply to all safety lamps below ground except auxiliary lamps and lamps used for certain special purposes. Regular maintenance tests are laid down in the new Regulations, and it is recommended that a regular system of photometric testing should be introduced at collieries.

Fluorescent Lighting in Homes and Stores

In connection with the fiftieth anniversary of the St. Pancras Electricity Department an interesting lecture on fluorescent lighting was given by Dr. J. W. Strange and Dr. H. H. Ballin, of Thorn Electrical Industries, Ltd., at St. Pancras Town Hall, on Monday, September 29.

In the first part of the lecture Dr. Strange discussed the various methods for starting the electrical discharge fluorescent tube and introduced the new *Atlas "Quickstart"* starting switch. This unit has been designed to give almost immediate starting of the tube, even under conditions of excessive voltage drop such as occurred last winter and which might well be experienced again.

This new unit consists of an auto-transformer, the primary winding of which is connected across the tube, the secondary winding being in two separate sections one across each cathode. When the lamp is switched on practically the whole mains voltage appears across the filament transformer primary, and the cathodes are heated by current from the secondary windings. As soon as the cathodes are hot, i.e., in about half a second, the tube strikes and the voltage across the primary of the transformer falls to the lamp voltage, the cathode voltages being correspondingly reduced. Starting is assisted by the proximity of an earthed shield inducing an electrostatic field. Rapid starting of an installation designed for 230 volts is obtained at mains voltage below 180 and once started the lamp will remain alight at voltages considerably lower than this.

Dr. Strange also dealt with the factors determining the design of fluorescent tubes and the variety of colours that can be produced by using different combinations of fluorescent materials.

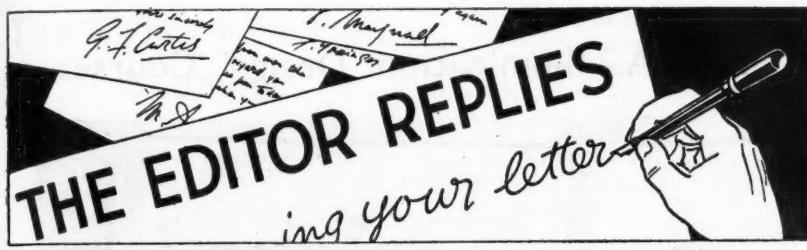
Dr. Ballin then dealt with the application of fluorescent lighting to store and domestic lighting. He referred to the

damage that had been done to the cause of good lighting by the wrong use of bare tubes or of purely industrial fittings in these fields, applications which have created some hostility to the non-industrial application of this new and flexible light source. He pointed out that modern fittings design and close co-operation between the architect and lighting engineer could bring about a revolution in lighting practice and would make lighting a most important part of modern building construction.

He also referred to the important factor of economy in current consumption which was effected by the use of fluorescent lighting which might give anything from four to nine times as much light as incandescent lamps for the same current consumption.

He said that there was a great field in the use of fluorescent lamps in lighting the home, a certain amount of experience in which had already been gained even when the 80-watt tube was the only one available. When smaller tubes become available they would undoubtedly find many applications not only in kitchens and bathrooms, etc., but also in general living rooms where they might be arranged to give very pleasant lighting effects. In the case of store lighting this was very much a matter of taste as well as efficiency, and it was thought that there would be room for both tungsten and fluorescent lamps for some time to come. It was suggested that fluorescent lighting could best be applied for general lighting, whereas tungsten lamps were most suitable for spot lighting.

Following the lectures was a mannequin parade to show the effect of various methods of lighting on gowns, costumes, etc. The stage was divided into two parts, each of which was fitted with incandescent lamps and daylight, warm white, red, blue, and green fluorescent tubes, each of which could be switched on independently or in conjunction with the remainder. It was found that the daylight tube was the nearest approach to real daylight conditions and the demonstration revealed the extent to which other light sources distorted colours.



I referred recently to several I.E.S. members visiting the U.S.A., and have since received an interesting letter from one of them, Mr. A. H. Owen, who was present at the Convention in New Orleans. He arrived in time to hear Mr. J. M. Waldram deliver his "Greetings from London," which took the form of an address occupying about 20 minutes and was admirably delivered. It was followed by prolonged applause. Mr. Waldram also took part very ably in subsequent discussions and earned a comment from the Chairman, to the effect that Britain should send more such ambassadors!

I again take the opportunity of inviting I.E.S. members in search of employment, or firms in the lighting industry looking for assistance, to make use of our columns. One is glad to learn that in a number of cases notices thus inserted have brought satisfactory results. In this connection I may quote an appreciative letter from one I.E.S. member whose requirements have thus been satisfied, and who concludes: "I feel that the publishing of the vacancies and the requirements of men in the lighting industry, in the columns of our own paper fulfils something long awaited, and helps to keep us together as the lighting section of the electrical industry."

Even to-day one still comes across misconception in regard to the **inverse square law** and the **cosine law**, which are said "not to apply" in certain circumstances. A curious instance was

afforded by an inquiry recently received in this office (apparently from someone concerned with research in optics), who asserted, as a recognised and familiar fact, that "tungsten lamps did not obey the cosine cubed law." It subsequently transpired that the inquirer was concerned with the illumination of objects under the microscope. If, as seems likely, the illumination was effected by light transmitted through a diffusing glass surface, very near to the microscope slide, the conditions might well approximate to those characteristic of the infinite plane source, so that the illumination would not vary appreciably when distance between source and object was changed.

There is evidently a brisk demand amongst I.E.S. members for the **Text-book on Illuminating Engineering**, by Dr. Walsh, recently published by Sir Isaac Pitman and Sons, Ltd. We are always glad to act as the intermediary in getting copies, but it should be explained that neither we (nor the I.E.S.) can offer the book at less than the published price as it is a rigid rule that discounts may only be granted to the trade.

A good illustration of the results of the heavy **arrears of maintenance and decoration** on railways is afforded by some of the escalators, lighted by indirect methods. I commented on this in our last issue (p. 165) and have since had a still better opportunity of confirming this on an escalator in process of

E.L.M.A. Illumination Design Courses



The above photograph was taken on the opening morning of the first E.L.M.A. post-war Birmingham Day Design Course which took place during September 22-25. The Lord Mayor of Birmingham, Alderman A. F. Bradbeer, opened this course, which was followed by an evening course starting on October 14. This is only one of a number of E.L.M.A. courses. A Scottish Design Course opened in Glasgow on October 10, and the 49th Illumination Design Course took place at the Bureau in London almost simultaneously.

redecorated. The contrast between the effect of the untreated curving roof and of the section newly cleaned and painted had to be seen to be believed.

I have not yet got full particulars of the device shown last year at an I.E.S. meeting in Bristol, enabling the light from fluorescent lamps to be raised and lowered, but a somewhat similar contrivance was shown at the recent St. Pancras display (see page 184). This permitted the lamp to function at quite a substantial drop in voltage—a consideration in these days when "cuts" in electric supply are so frequent and unexpected diminutions in pressure are liable to occur. Another item of interest at that display was the new 8 ft. tube, a novelty which is no doubt partly responsible for the tendency, recently noted, to install integrating sphere photometers of yet larger diameter.

I have been asked—as has happened before at this season of the year—

whether there is any likelihood of a relaxation in the ban on shop-window lighting during the Christmas period. I understand that the National Chamber of Trade is making an effort in this direction, but I fear that concessions are unlikely.

Application of Fluorescent Lamps to Street Lighting

A useful B T H Bulletin (No. 19), by L. J. Davies and W. D. Sinclair, contains illustrations and light distribution curves for typical lanterns for fluorescent street lighting and photographs showing results in Rugby and London. Installations have now been in operation for over a year, and no special climatic difficulties seem to have been met. In this respect and in some others experience has been more favourable here than inquiries in America might have suggested, and for roads in cities there is evidently good scope for this form of lighting.

The Lighting of Farm Buildings

In what follows we give extracts from a paper by A. C. Sandow entitled "Rural Victoria Lights Up" which appeared in the Transactions of the Illuminating Engineering Society of Australia for April, 1947

Natural Lighting

A great deal of farm work, sheep shearing, wool classing, food preparation, grading and packing of farm produce, etc., is carried out during daylight hours when the amount of natural light admitted to buildings is controlled by windows and other openings.

In the design of farm buildings to take the fullest advantage of natural lighting there is no one formula that can be used. It should be remembered, however, that the upper part of a window is the most important, as light entering through that part will penetrate further into the building than that entering through the lower part. Any glass below the level of the working plane may be disregarded in calculating the required area of window or other opening. Glass areas should receive as much unobstructed light from the sky as possible. Skylights, if properly designed, give good results and should, where possible, face south to avoid the entry of direct sunlight.

Artificial Lighting

The fact that about 50 per cent. of the work in diversified farming is performed around the farm house in caring for livestock, repairing and improving buildings and equipment, preparing and distributing feed, etc., suggests the importance of lighting for the more effective use of buildings and equipment. Farm buildings should therefore

be wired and lighted to aid production and to promote safety and efficiency.

Safety is of paramount importance, and lights should be placed over dark stairways and ladders. Vapour-proof fixtures are needed in dusty rooms and hay sheds, and suitable guards are necessary for fittings and switches which may be touched by animals.

MILKING SHEDS AND DAIRIES

In milking sheds and dairies cleanliness is a main consideration. Consequently good lighting is very important, and a minimum consumption of 2 watts per sq. ft. is recommended. For several months of the year milking takes place in the hours of darkness or semi-darkness, when most farmers would welcome good lighting if shown how to use it. Many farmers are content with approximately 1 ft. candle at the milking point, though the efficient use of, say, 60- or 100-watt lamps will give much higher illumination. Where milk is separated, cooled and bottled, good lighting is essential in producing high-quality milk. A single 100-watt inside frosted lamp in an enamelled steel reflector mounted at ceiling height will usually provide satisfactory local illumination, though work areas may require special treatment.

GRADING AND PACKING ROOM

Grading and packing rooms require distinctive treatment. Colour is an important factor in the grading of many agricultural products in order to detect flaws, disease or dirt spots and undesirable variations in colour, e.g., when examining fruit, eggs, butter, wool, etc. The use of daylight fluorescent lighting for this purpose is rapidly extending on farms. At present it is being used on farms in Victoria for grading tobacco, tomatoes, citrus, stone fruits and eggs. In addition to giving a more consistent degree of illumination than daylight this form of lighting now enables grading to be carried out at night time.

Silos and hay sheds require careful study, as these are usually rather gloomy even in daylight. A light on top of the silo so installed as to light the silo and chute is a great help. In hay sheds small

dust-proofed floodlights can be installed above the hay line on opposite walls.

YARD LIGHTING

Suitable lights, carefully planned and well placed, are needed in farmyards to permit safe and fast working at nights. They can be mounted either on a yard pole or on a shed or other building high enough to provide wide illumination. 100-watt lamps with shallow reflectors are recommended, mounted at a minimum height of 15 ft. in order to avoid glare and to scatter the available light over a wide area. Special needs can be met by angle reflectors and floodlights. A liberal use of white paint on posts, buildings, thresholds, steps, etc., is also recommended.

LAYING-PEN LIGHTING

A feature of egg production, which repeats itself from year to year, is that of the rise and fall of yields from autumn to spring and from spring to autumn. This change bears a very close relationship to the change of length of day throughout the year. Tests have been carried out to ascertain the effect of an induced variation of the latter on egg yield. As an outcome of these tests it is now definitely accepted that some artificial lighting must be used if maximum production is to be expected during the dark winter months, at which time eggs are normally scarce and dear. By providing the birds with a 12- or 14-hour day in autumn and winter, production over a five-month period has been increased by nearly 40 per cent., and in certain cases over a two-month period by as much as 200 per cent.

A satisfactory type of lighting unit for such purposes consists of one 60-watt lamp in a 15-in. x 4-in. metal cone-shaped reflector. The reflectors should be placed so that light is thrown directly on to feed hoppers, water troughs and nests. Such a unit will serve a pen 20 ft. by 20 ft. housing 100 birds, though an installation of two 40-watt lamps might be more convenient. The installation can be controlled by a time-switch, thereby rendered fully automatic. The consumption of electricity would be in the order of 4 or 5 kw.h. per 100 birds per month.

Special applications of light are in

connection with egg-testing, for which a strong shaft of light is required, and the determinations of the sex of newly hatched chickens—effected by keen eyesight supplemented by exceptionally high local illumination. Attention is also drawn to insect traps, based on the attracting power of light, of which quite a number of varieties exist.

PROMOTION OF PLANT GROWTH

Research has shown that the growth, flowering and fruition of plants is controlled largely by the total number of hours of light experienced by the plants. The essential chemical reaction proceeding in a plant is made possible by the action of light, and if the illumination drops below a certain level, as it does during the short days of winter, growth practically ceases. By augmenting the natural light with an auxiliary source of illumination it has been found possible to obtain growth in the out-of-season period.

Many crops will respond to very low light intensities, and a 40-watt lamp placed in a suitable reflector three to five feet above the bench will produce sufficient light to give satisfactory results, and in some cases even 25- or 15-watt lamps may be used. This does not mean, however, that artificial light of low intensities may be used to replace sunlight entirely. The use of low-wattage incandescent lamps has the advantage of low-watt density with a corresponding low-heating effect, though vapour discharge lamps or daylight fluorescent lamps may also be used.

Records of results obtained from artificially lighted strawberry plants, rose trees, etc., are presented.

FARM HOMES

Besides the lighting of buildings devoted to farm operations, the lighting of the home itself should not be neglected. In an appendix the author gives specific suggestions for living rooms, kitchens, bathrooms, etc. As there are about 115,000 extra-metropolitan homes in Victoria connected to public electricity supply and increasing by some thousands every year, there is here a definite field for development.

Street Lighting in Cheltenham

(Communicated)

Street lighting installations should be planned to afford maximum visibility. With this in view the two main considerations should be the avoidance of glare and the presentation of a background of uniform brightness, against which objects may be clearly seen. This background, be it noted, includes "not merely the carriageway and footway surfaces, but also other surfaces such as those of buildings or fences against which objects may be seen." (M.O.T. Final Report, 1937, Para. 55.)

Most of the light should be directed on the carriageway surface, uniform brightness of which is much more important than high intensity. "Cut-off" fittings offer an obvious means of eliminating glare, but the "spacing to height" ratio is necessarily limited, and cannot usually be allowed to exceed about 4 : 1, otherwise alternate bright and dark patches are liable to occur. Fittings of the non-cut-off type may be used at greater ratios. Here the *angular separation of successive units* is of greater moment than the actual linear spacing. Thus paragraph 46 in the M.O.T. final report states that ". . . successive significant dark areas will appear on the road surface if the sources more than some 200 feet ahead of the driver appear to him to be widely separated, irrespective of their linear distance apart."

In order to minimise glare from fittings of the non-cut-off type the ratio of their brightness to that of the illuminated background should be limited, and this is usually effected by carefully designed refractors and reflectors which are so located as to obtain as high a background brightness as possible, due use being made of the carriageway sur-



The Promenade, Cheltenham, lighted by Revo "Sol-etern" lanterns, each housing two 80-watt 5-ft. tubular fluorescent lamps.

face, usually of semi-polished nature. The ideal, however, is to utilise sources which are themselves of low brightness, such a source is now afforded by the fluorescent tubular lamp.

The use of such sources implies special lantern design. The "Sol-etern" lantern manufactured by Revo Electric Co., Ltd., incorporates two 5-ft. 80-watt fluorescent lamps and combines in one unit the advantages of both cut-off and non-cut-off fittings as spacing to height ratios as high as 6 to 1 may be adopted without any noticeable glare. The lamps furnish a wide lateral spread of light. Trials have shown that with a mounting height of 25v./ft. and a spacing of 120 to 150 feet ample visibility is secured.

The illustration shows the effect of this mode of lighting in a main street, the famous "Promenade" in Cheltenham.

Stage Lighting

A useful guide on additive colour-mixing systems for stage lighting has been prepared by the Strand Electric and Engineering Co., Ltd. Colour mixing of light presents certain difficulties, particularly to amateurs, and the guide has been produced to explain the processes in a simple manner.

Copies of this guide may be obtained free of charge on application to the Strand Electric and Engineering Co., Ltd., 24, Floral-street, Covent Garden, W.C.2.



Recent Patents

No. 589,578. Improvements in and relating to Inspection Lamps. (F. G. Horstmann. March 5, 1945.)

This specification covers improvements to inspection lamps, including a magnifying lens combined with a lamp housing and shade such as have been covered by previous patents. The new lamp is characterised by the provision of a cover for the lens, whereby the direct access of light to the lens from above may be prevented when the latter is not in use, thereby obviating the risk of fire.

No. 589,773. Fluorescent Electric Discharge Tube. (Lumalampen Aktiebolag. May 2, 1944. Convention, Sweden.)

This specification covers a fluorescent electric discharge tube containing a low-pressure atmosphere of a rare gas and mercury vapour and provided with a fluorescent tubular envelope, the length of which is at least ten times the diameter of the tube. Close to one or both of the main electrodes of the tube there is a starting electrode lying in the current circuit parallel to the main discharge path and including an impedance. The starting electrode is shaped like a cup covering the front of the adjacent main electrode and designed to serve as a screen, reducing the sputtering from the main electrode.

No. 589,850. Improved Table or Bracket Electric Lamp. (A. J. Curnow. March 30, 1945.)

This specification covers a table or bracket electric lamp for use with A.C. supply mains. It can be used either as an ordinary table or bracket lamp with a bulb of mains voltage or as a low candle-power lamp with a bulb of low voltage so as to be suitable as a night or nursery light or for any other pur-

pose where a dim, low-consumption light is required. The illumination given by the low candle-power bulb can be reduced to any desired level. The lamp incorporates a transformer on or within the stand to give the low-voltage current.

No. 589,982. Improvements in or relating to Street Lamps and the like. (North Middlesex Gas Co., F. Dawson, and J. H. Burman. April 8, 1945.)

This specification covers a lamp embodying a cut-out device giving a penumbra lighting effect. The cut-out device comprises a prism of transparent or similar material through which the light passes. The contour of the face of the prism nearest the light source and the disposition of that face in relation to the light source determines the penumbra effect the other faces of the prism being disposed to direct downwardly into and outside the penumbra light rays which pass through the prism. The shape of the prism will depend on the character of the light source and upon the directions in which it is desired the light be emitted.

No. 590,150. Light fittings for tubular Electric Lamps and particularly for Luminous Discharge Tubes. (A. H. Ansell. April 27 1944. Convention, Sweden.)

This specification relates to a light fitting for tubular electric lamps in which different fastening means for lamp holders and for any other fittings such as shade or reflector holders, chokes, etc., are displaceable along a horizontal bar and are capable of being locked in any position. The bar consists of a tube made in one piece and having closed I-cross-section, on the flange of which the various fastening means may be secured.

ion
ion
can
The
or
age

lat-
like.
two-
6,

em-
a
out
ent
the
ace
and
ion
the
the
vn-
ora
ism.
on
and
de-

lar
for
H.
ion

ght
in
for
ngs
rs,
a
ng
on-
nd
he
ng